CLAIMS

What is claimed:

1. A reaction system for the preparation of a fiber reinforced composite in a pultrusion process, the reaction system comprising:

a) a liquid reaction mixture formed by combining a polyol component and a polyisocyanate component; and

b) a continuous fiber reinforcing material, wherein the liquid reaction mixture initially contains both free isocyanate groups and free alcoholic -OH groups, and gels between 340 and 768 seconds at 25°C and between 95 and 210 seconds at 140°C.

2. The reaction system according to Claim 1, wherein the reaction mixture contains release agent.

3. The reaction system according to Claim 1, wherein the reaction mixture contains one or more catalysts suitable for promoting at least one reaction selected from the group consisting of the reaction of isocyanate groups with alcohol groups to form urethane bonds, and the trimerization of isocyanate groups to form isocyanurate groups.

4. The reaction system according to Claim 1, wherein the Index of the reaction mixture is from 200 to 1000 and the reaction mixture contains at least one catalyst for the trimerization of isocyanate groups.

5. The reaction system according to Claim 1, wherein the Index of the reaction mixture is less than 200.

6. The reaction system according to Claim 1, wherein the reaction mixture is devoid of amines.

7. The reaction system according to Claim 6, wherein the reaction mixture contains metal carboxylate release agent.

8. The reaction system according to Claim 7, wherein the metal carboxylate release agent is selected from the group consisting of zinc stearate, calcium stearate, and mixtures of thereof.

9. The reaction system according to Claim 1, wherein the reaction mixture contains phosphate release agent.

10. The reaction system according to Claim 1, wherein the reaction mixture contains aromatic polyester polyol.

11. The reaction system according to Claim 1, wherein the reaction mixture comprises isocyanate terminated prepolymer.

12. A reaction system suitable for the preparation of a fiber reinforced composite by means of a pultrusion process comprising:

a) a liquid reaction mixture formed by combining a polyol component and a polyisocyanate component; and

b) a continuous fiber reinforcing material, wherein the liquid reaction mixture initially contains both free isocyanate groups and free alcoholic -OH groups, has a gel time in the range of 84 to 600 seconds when maintained at 23°C, and cures within 1 minute when heated to a cure temperature in the range of 120 to 140°C.

13. The reaction system according to Claim 12, wherein the reaction mixture comprises at least one member selected from the group consisting of fatty ester release agent, phosphate release agent, wax release agent, fatty amide release agent, hydrocarbon release agent having from 10 to 19 carbon atoms, polyester polyol, metal carboxylate release agent, and mixtures thereof.

14. The reaction system according to Claim 12, wherein the polyisocyanate component comprises isocyanate terminated prepolymer.

15. The reaction system according to Claim 12, wherein the polyisocyanate component is a mixture of 2,4'-MDI, 4,4'-MDI, and pMDI, having about 19.5% by weight 2,4'-MDI, 60.9% by weight 4,4'-MDI, and 19.6% by weight pMDI, and having an NCO value of 32.5.

16. The reaction system according to Claim 12, wherein the polyisocyanate component comprises uretonimine modified MDI.

17. The reaction system according to Claim 12, wherein the polyisocyanate component comprises polymeric MDI.

18. The reaction system according to Claim 12, wherein the reaction mixture contains alkali carboxylate catalyst.

19. The reaction system according to Claim 18, wherein the alkali carboxylate catalyst comprises a potassium carboxylate.

20. The reaction system according to Claim 12, wherein the reaction mixture contains a blocked amine catalyst.

21. The reaction system according to Claim 12, wherein the reaction mixture contains a tertiary amine catalyst.